

University of Cincinnati

EDUCATION AND RESEARCH CENTER FOR
OCCUPATIONAL SAFETY AND HEALTH

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Program description

The University of Cincinnati (UC) Education and Research Center (ERC) provides education, consultation, community service and research for workers, employers and residents throughout our DHHS region of Ohio, Indiana, Illinois, Michigan, Wisconsin and Minnesota, across the United States and in several other countries. The ERC has a full complement of Core Programs—Occupational Health Nursing, Occupational Hygiene, Occupational Medicine Residency, Occupational Safety and Health Engineering. The ERC provides three component training programs—Biomonitoring, Hazardous Substances Academic Training, and Pilot Research Training Program. Continuing Education, Targeted Research Training and Outreach involves all of the academic programs.

The ERC programs bring together three colleges: Engineering and Applied Science (Occupational Safety and Health Engineering), Medicine (Occupational Hygiene, Occupational Medicine Residency, Biomonitoring, Hazardous Substances, Pilot Research Program, Continuing Education and Outreach), and Nursing (Occupational Health Nursing). All three colleges are within close proximity on the campus.

Major accomplishments

Education of MS and PhD students is a critical component of the ERC, as is shown below. Additionally, Continuing Education served 5,897 participants in 322 courses.

Number of enrolled and graduated students in each program in 2009-2010—full time and part time.

	Total Enrolled		Graduated	
	MS	PhD	MS	PhD
Occupational Health Nursing	6 (MSN)	5	2 (MSN)	-
Occupational Hygiene	13	4	3	-
Occupational Medicine Residency	7	-	4	-
Occupational Safety and Health Engineering	7	3	2	-
Biomonitoring	2	1	1	-
Hazardous Substances Academic Training	6	-	2	-

Enhancements to the education mission facilitated by NIOSH funding include:

- Development of Outreach to more fully involve students.
- Occupational health and safety concepts were integrated into the community health curriculum in nursing. In the unit on epidemiology, students had hands on experiences in designing and implementing community responses to the H1N1 flu epidemic.
- Occupational Health Nursing and Occupational Medicine have redesigned courses in Occupational Disease Management into one course for students of both disciplines.
- In Occupational Safety and Health Engineering, a new project assignment was developed and assigned with a focus on design safety.
- In Acoustics I, a two-hour lecture about assessment of the risk of noise induced hearing loss and noise guidelines was developed.
- A webinar was developed and offered four times to assist new trainers approved by the U.S. EPA to present lead Renovation, Repair and Painting courses.
- Introduced “Nano-aerosols, health and safety” as a part of the required graduate course in “Physical and Biological Aspects of Aerosols”.
- In the Workshop class taken by all ERC students, research training skills was enhanced by including work on writing, focus groups, qualitative assessments, and Human Subject protocols.

Research findings relevant to improving health and safety in this region have been reported in the literature. Brief examples from this year follow.

- A study on the impact of an eight hour refresher course on changes in behavioral safety following an 8-hour interactive course for hazardous waste site workers and emergency responders identified actions taken in the workplace to reduce hazards.
- An evaluation of a previous intervention study using tailored email messages and accelerometers to measure activity showed that the program was effective in reaching large numbers of people at a low cost.
- Kurtosis correction to Sound Pressure Level measurement of noise was found to provide a much improved correlation with noise induced hearing loss observed in chinchillas. The result will be extended to develop an improved noise guideline for human workers.
- Vibration influenced fluid circulation through a vertical conduit more significantly than through a horizontal conduit. This may help us understand effect of vibration on workers.
- New types of respirators were jointly developed with a regional company, Technova Inc., in collaboration with the Department of Defense.
- Changing postures during the work day during intense data entry was found to reduce discomfort in the shoulders, upper back and lower back without adversely influencing productivity.
- A study at Cincinnati Children's hospital identified some significant injuries among nurses, including patient interactions (e.g., hit by patient); slips, trips and falls, and musculoskeletal injury of the back.
- A PhD student reported the impact of biomechanical and ergonomic risks associated with school backpacks among school age children in Hamilton and Butler Counties in greater Cincinnati area.
- No exposure-related longitudinal decline in pulmonary function was observed among refractory ceramic fiber workers (one plant in Indiana).

Many of the results noted above or from previous years led to further funded investigations. For example,

- Robert Wood Johnson Foundation: Interdisciplinary organizational intervention to improve quality outcomes in long-term care.
- Department of Veterans Affairs (VA) Medical Center: Hemodynamic Analysis of AV fistula stenosis.
- Resonance Technology Inc.: Development of an ANC System for MRI Compatible Headphone to Treat Noise Emitted during Scanning Operation.
- DoD and Technova Inc.: Development and evaluation of a new type of faceseal filtering particulate respirators.
- HillRom: Biomechanical responses when interacting with various components of the hospital beds.
- Innov-X division of Olympus: X-Ray fluorescence analyzer.
- NIEHS: the Midwest Consortium for Hazardous Waste Worker Training was renewed. Annually more than 15,000 workers in the region participate in training required by 29CFR1910.120.
- A Health and Safety Notebook was developed using ARRA funds for use during training of unemployed workers to provide weatherization services in their communities.

The University of Cincinnati ERC translates research findings to practice, improving health and reducing health care costs. Selected recent examples are:

- Results on work patterns of hospital case managers are used in a large medical center to improve the delivery of health care processes and control cost of care by reducing redundancy.

- Data on nursing care and competencies essential for delivery of care is used to design patient classification systems to ensure appropriate staffing levels.
- An improved method to assess the risk of noise in the military was developed.
- A wearable ultra fine particle detector was developed.
- Adjustable carts were shown to reduce poor trunk postures that could result in low back injury, while increasing the productivity of the grocery store workers.
- Students constructed, installed and monitored the use of a bulletin board containing health and safety information in Spanish and English at a center for low-wage workers.

Interdisciplinary interaction occurs at many levels at the UC ERC, including:

- Interdisciplinary field visits: Surface coal mine, eastern KY; Louisville KY Environmental Justice Tour; Construction Safety Day, Cincinnati OH; Underground coal mine, western KY; KY bourbon trail; National Action Latino Summit for Health and Safety, Houston TX; Workers Memorial Day, Cincinnati OH; NY/NJ ERC Historical Tour; History of Occupational Health and Safety, San Francisco CA
- Seminars: Dr. John Howard (UNC ERC NORA seminar) "Changing nature of work"; Dr. Hemantha Wickramatilake, Director General, NIOSH, Sri Lanka, "Occupational health and safety in Sri Lanka: tripartite program development"; ACGIH, "Emergency Response Planning webinar"; Manny Halpern, Ph.D., NYU (NY/NJ ERC), "From r2p: application of the model NIOSH ergonomics program in a health care setting."
- Workshops: Annual ERC Workshop. 2010 topic: firefighters' health and safety.
- Targeted Research Training: Students in all disciplines participated in the firefighter pilot study.
- The Pilot Research Training Project Symposium. The symposium provides meeting and discussion time for all recipients from the ERC and the 11 other participating organizations. The tenth Annual Symposium took place on October 1-2, 2009. Symposium and included 22 presentations on topics such as a Lab-On-A-Chip Sensor for on-site Detection and Sizing of Nanoparticles, Identifying Environmental Influences on Obesity Risk Factors of Commercial Truckers, Tracking Toxic Gases Penetration through Firefighter's Garment, Immunoregulatory Responses in Trimetallic Anhydride Occupational Sensitization. Ten recipients published 13 articles in peer reviewed journals; seven grants totaling \$1.25M were obtained by six awardees using data from their pilot investigations.

Other accomplishments:

- The ERC launched a blog to report interdisciplinary project progress and accomplishments (www.eh.uc.edu/erc).
- Faculty honors/achievements
 - The Advisory Committee to EPA Science Advisory Board to evaluate research findings related to dust lead standards; Editor of the *Aerosol Science and Technology* journal; Co-chair of Legislation/Regulation focus area of WHO/UNEP Global Alliance to Eliminate Lead in Paint; Co-founder (with UC Bone Health Center Director, Nelson Watts, MD) of a start-up company, OsteoDynamics, Inc dealing with new technology of early detection of bone/musculoskeletal health affected by environmental and life style factors.
- Student honors
 - H. Kenneth Dillon Memorial Award from AIHA for the best student poster on the areas of biosafety and environmental microbiology; AIHCE 2010 conference; Best poster award from the AIHA Occupational and Environmental Medicine Committee, AIHCE 2010 conference.